Promoting students' critical thinking through online learning in higher education: Challenges and strategies

Tathahira Tathahira
Universitas Islam Negeri Ar-Raniry, Banda Aceh, Indonesia
tathahira92@gmail.com

ABSTRACT

Living in the millennial era has encouraged all the learners to one step ahead maximizing the existed and updated technology for learning. Maintaining autonomous and long-distanced learning should have been introduced and implemented in higher education. Involving in an online learning environment is not enough without the ability to think critically. Critical thinking is the ability that is essentially required for learners in a higher education context. This paper discusses the challenges and strategies for implementing learners' critical thinking through online learning. This paper used the literature study approach, in which all the information in this paper was obtained from books and journal articles. Briefly, the findings reveal that online learning can be good support for students to improve their critical thinking ability. However, there are also several challenges to do so involving the socio-cultural matter, the students' previous learning habits, and the familiarity of using updated technology for learning. To end the discussion, the author provides several strategies to overcome those challenges. The well-designed online discussion (interactivity), critical-thinking learning content, and well-maintained instructions are several factors needed by online course instructors in order to improve their students' critical thinking.

Keywords: *Critical thinking; Online learning; Higher education*

1. Introduction

Critical thinking and technology are the two most prominent elements grounded in today's globalized educational environment. Critical thinking ability is highly encouraged by educators for their students to challenge their students to achieve critical values, the sense of creativity, and the requirement of high-order thinking (Harvey & Kamvounias, 2008). By implementing the critical thinking concept, students are expected to link their thinking and ideas with contextualized life aspects. Thus, students will acquire the concept to think critically, to act and solve the problem by considering the factors existing around them. Simultaneously, the advance of technology is considered as good support in the modern classroom (Habiburrahim, 2015; Zainuddin, 2015). The use of technology like online learning in the learning process in higher education should foster usefulness for learners, including promoting students' critical thinking. For instance, the use of digital learning platforms such as Moodle could help students develop their reasoning, problem-solving, and decision making (Lopez-Perez, Perez-Lopez, & Rodriguez-Ariza, 2011). Moreover, combining critical thinking process and online-based activity, like asynchronous online discussion can be an advantage and opportunity for students to gain their interests, and to reach a higher level of knowing (Carmichael & Farrel, 2012; Foo & Quek, 2019). However, this phenomenon creates challenges for educational practitioners to bring critical thinking concepts and their implementation in online-based learning synchronously. This paper attempts to discuss the promotion of critical thinking values toward higher education students through online based or digital learning platform. The focus of this paper is to examine the significances of critical thinking concepts related to the online-based learning environment and the challenges which might be faced by the educational practitioners and to offer several possible strategies to overcome those challenges.

2. Literature review

2.1. Definition of critical thinking

Critical thinking is universally recognized as a term which reflects higher level thinking. There is no single exact answer in defining critical thinking. Many theorists have their versions and point of views in defining critical thinking. Scriven and Paul (2003) describe that critical thinking is the intellectually disciplined process to conceptualize, apply, analyze, synthesize, and/or evaluate information collected from observation, experience, feedback, reasoning, or communication, as a way to believe and act. From the definition above, critical thinking is a complex and varied process in understanding, comprehending, seeing and interpreting particular information based on several contexts.

In a similar vein, Davies (2015) formulates the model of critical thinking as the ability to convey a reasoned argument and to make a decision. Critical thinking as argumentation involves the sense to differentiate valid and invalid arguments, from erroneous reasoning to valid reasoning. While critical thinking as decision-making

appears after we are compelled by the arguments to make decision and judgment. Moreover, the ideal critical thinker is evident in the American Philosophical Association's consensus portrait of the ideal critical thinker. A critical thinker is defined as someone inquisitive in nature, open-minded, flexible, and fair-minded, has a desire to be well-informed, understand diverse viewpoints, and is willing to both suspend judgment and to consider other perspectives (Facione, 1990).

Critical thinking is not just the process of thinking, critical thinking also becomes an important skill required in the world of work and employment. Chartrand, Ishikawa, and Flanigan (2009) found that critical thinking was regarded as an important skill highly required in working experience in the future, ranked higher than innovation or information and technology knowledge. Considering all the critical thinking definitions above and its crucial benefits in the working experience, it is reassured that the sense of critical thinking is associated with the cognitive skill and the process of a higher level of thinking. Before jumping to the working life, the acquaintance to critical thinking is firstly obtained from the educational life.

2.2. The significances of critical thinking in higher education

Critical thinking is considered a compatible concept and an ability of thinking which is significantly required in higher education. Critical thinking is generally conceptualized as an intellectual ability suitable for development by those involved in higher education (Davies, 2015; Meyers, 1986; Lloyd & Bahr, 2010; Stice, 1987). Critical thinking is the ability that is essentially required in higher-level education and for learning objectives (Kuhn, 1999; Moon, 2007). Similarly, higher education students are supposed to reflect higher-level thinking. Thus, critical thinking ability has been highly encouraged by educators for their students to challenge their students to achieve critical values, the sense of creativity, and the requirement of high-order thinking (Harvey & Kamvounias, 2008). In order to seek what makes critical thinking beneficial in a particular educational aspect, Paul and Elder (2008) believe that students who know how to analyze and critique ideas are able to make connections across disciplines, see knowledge as useful and applicable to daily life and understand content on a deeper, more lasting level. Moreover, Zhang and Sternberg (2006) also mention that critical thinking enables students to assess their learning styles, strengths and weaknesses, and allows them to take ownership of their education. Additionally, Peck (2012) discusses the urgency with which stakeholders in education want students to graduate with critical thinking skills to compete in the expanding global economy.

Therewith, practically, critical thinking values have long been implemented in the higher education curriculum. A National Institute of Education report in 1984 concludes that "a college education should enable students to adapt to a changing world and that successful adaptation requires the ability to think critically, to synthesize large quantities of new information" (as cited in McMillan, 1987, p. 3). More importantly, critical thinking takes part in defining the role of teachers and students. Declaration of

Educational Goals for Young Australians (Ministerial Council for Education, Early Childhood Development, and Youth Affairs, 2008) states that successful learners as those who are "able to think deeply and logically and obtain and evaluate evidence in a disciplined way as the result of studying fundamental disciplines" (p. 8); and, elsewhere, as those who "are able to make sense of their world and think about how things have become the way they are" (p. 8). This indicates that, for the pre-service teachers who participated in this study, it is important to be engaged in critical thinking: (i) for their own academic development and to demonstrate this capacity as a part of achieving the requisite Graduate Attributes; and, (ii) for understanding its role in their future professional practice as teachers. Similarly, Bradford University also defines critical thinking as the 'objective': "Critical Thinking: To support students and staff in developing a critical, independent and scholarly approach to their discipline which will enable them to apply their knowledge" (Bradford University Mission Statement, as cited in Moon, 2007). Considering the urgency and the significance of thinking critically, the author agrees that critical thinking is the number one skill that should be completely encouraged in today's higher educational environment.

3. Method

This paper employed the literature study approach. The information obtained for conducting this paper was based on books and journal articles. In order to obtain relevant information, issues, and trends related to the implementation of online learning that could promote students' critical thinking were gathered. The collection of literature was done in several steps. First, free online databases such as Google Scholar, academia.edu, researchgate.net became the main sources of obtaining the literature. However, updated studies were barely found due to the limitation of accessing other journal databases. Simultaneously, in this stage, the author also inserted some combined keywords namely: "critical thinking", "online learning", "critical thinking in higher education", "improving critical thinking through online-based learning" and so forth.

After that, the author delimited the downloaded articles into several themes, namely: the context of research (specific learning program in a higher educational context); the significance of critical thinking in education; challenges faced by learners in achieving higher-order thinking through online-based learning; and strategies used by learners to overcome those challenges.

This paper was categorized into a descriptive review. In obtaining reliable information, the author searched for published literature and classified them into particular and desired topics. Having selectively classified the available literature, the author attempted to discuss the issue of the study, analyze and to identify some gap, and to draw conclusions related to the discussed topic. A descriptive review was conducted as a series of analysis of the published literature providing a database from which the authors attempt to identify any interpretable trends or draw overall conclusions about

the benefits of existing conceptualizations, propositions, methods, or findings (Paré, Trudel, Jaana, & Kitsiou, 2015).

4. Findings and discussion

4.1. Online learning for promoting students' critical thinking

The term "online learning" has no exact definition as it is often used with numerous similar terms such as, "e-learning", "distance learning", "virtual learning", "technology-based learning", "network learning", "multimedia-based learning", "web-enhanced learning", "internet-enabled learning", and many else. However, it is certain that online learning is a learning model wherein electronic technology, the internet, and the web are integrated and combined to maintain a learning environment (Hadjerrouit, 2007).

Influenced by the rapid growth of new technology, online learning is increasingly important in today's educational environment. Online learning activities can potentially develop students' critical thinking. Online learning also involves educators to interact with the students in online instructions, to activate self-efficacy in analyzing the instructions, to make judgment toward varied information, and to seek for truth and solution. Critical thinking is considered as an important attribute in online learning environment, to be owned by the professional learners and for sustainable learning; hence, learners are able to synthesize and evaluate sources of knowledge and to integrate with social-networking based learning (Carmichael & Farrell, 2012). This kind of activity describes the application of critical thinking behavior. Critical thinking should be encouraged throughout every online education course for conveying information and enhancing discussions in an organized manner (Ricci, 2009).

Additionally, for a more convincing claim, Bloom (as cited in Kinne & Eastep, 2011) argues that the cognitive domain of the thinking process is more conducive to be applied to online learning. Besides, the performance of distance learning utilized the information from the internet, educators should be critical in choosing the sources (Ricci, 2009). Resulting from its practical use, in many online environments, the level of critical thinking development occurred in online discussions, including web-based chats, discussion boards, and email (MacKnight, 2000). MacKnight also adds that online discussions have been found to be effective for instructors to coach and develop deeper and more reflective learning because they put emphasis on the elements of arguments and the exchange of ideas. Plenty of studies have shown that online activity has positive effects on students' particular academic performance. The concepts and behaviors related to critical thinking values can be enhanced through online-based learning. Jang (2009) argues that the use of online (web-based) interaction can enhance the students' creativity. The accessibility, abundance, diversity, and rapidity of the information on the internet have been widely used by the students to challenge themselves to renew and produce creative ideas (Chang, 2012). Moreover, some

theorists have been aware of the positive impact of innovative ways of modern learning in digital learning platforms in several universities. The use of digital learning platform such as Moodle is believed to help students to develop reasoning, problem-solving, and decision-making (Lopez-Perez et al., 2011). Eventually, in netting those benefits, there are some ways necessarily implemented in designing the online course. Goodsett (2020) has formulated a rubric encompassing some criteria to measure the effective implementation of critical thinking activities through: criteria for teaching critical thinking, criteria for assessing critical thinking, and criteria for judging the quality of online learning design.

In addition, traditional methods, like face-to-face learning, have been replaced by online classroom. There are some benefits of online classrooms compared with traditional teaching practices (face-to-face classroom). Through online learning, the students have had more time to elaborate on their answers and ideas compared with traditional classes, where the students are oppressed with limited time to respond. The asynchronous structure of online learning, unlike the time-limited constraints of a scheduled class period in the traditional classroom, allows the students to adjust the time necessary for individualized reflection, investigation, and inquiry. Rather than being required to immediately think and respond to the questions posed in a face-to-face class, the students in online classes have the opportunity to ponder, investigated, and question prior to submitting their responses (Pyle, 1997).

Moreover, online learning has been more conducive to the incorporation of implementation of critical thinking behavior reflected as active learning, rather than the time-limited interactions dictated by a traditional classroom (Astleitner, 2002). Furthermore, distance learning may give confidence for the students to actively do their studies. The theoretical arguments favoring the asynchronous interactions available in an online classroom for the encouragement of critical thinking have been centered on the students' opportunities to actively process information, reflect and investigate questions prior to responding (Mandernach, 2006). Recapitulating all the arguments, it can be argued that online learning is more popular, conducive, and compatible than the traditional pedagogical methods in enhancing the students' critical thinking in the modern educational environment.

4.2. Challenges of implementing critical thinking in online learning

However, despite all the benefits, bringing critical thinking into online-based learning at the same time challenges educational practitioners, in particular the teachers. In this part, the author provides several issues related to the implementation of critical thinking through online learning encompassing the socio-cultural, theoretical, and practical, methodological, and technical issues. First of all, critical thinking has a relationship with the socio-cultural factor. According to the research conducted by Stapleton (2001), Asian students, like Japanese students, could not reflect the critical thinking concept in their English writing because critical thinking which is Western-

oriented may differ from the Eastern educational culture. In addition, critical thinking is not just a matter of culture, but also it is also hardly taught for the students socially. As Atkinson (1997) claims, critical thinking is a difficult term to define though it exists in social practice. Critical thinking is a new way of thinking, yet it should not confuse students toward the fascination of suddenly seeing the world in a new way through novel conceptual or a methodological tool for analyzing the world (Erikson, 2019).

Then, the most influential factor is how instructors can provide a proper topic which fulfills the needs and understanding of critical thinking. Topic familiarity is seen as a supportive factor to develop the reasoning skill as a skill which reflects critical thinking behavior. As reflected in Stapleton's research, it was revealed that the lack of critical thinking of Japanese ESL college students was displayed in academic writing because they used American topics. However, such a case did not only happen in Japanese schools but also in Indonesian schools. A study by Samanhudi and Sampurna (2010) investigating the Indonesian EFL students from one of the universities located in Banten Province found that the students with no prior knowledge or subject matter mastery gained through critical reading on the topic would have a problem to develop their critical thinking skill. Therefore, the teachers need to highly pay their attention to contextualize and position themselves to the socio-cultural values set in teaching critical thinking in diversities.

Secondly, the higher educational practitioner including teachers and institutions are challenged to design and choose the proper methods and techniques in teaching critical thinking supported by online activity. Phirangee, Demmans, and Hewitt (2016) mention that the popularity of online learning has boomed over the last few years, forcing instructors to consider the best way to design their courses to support students' learning needs and participation. It is undeniable that some teachers do not master the use of technology yet. Arend (2009) describes that some instructors seem to be unfamiliar with designing and deciding the best methods through the online-based activity for promoting critical thinking. The issue thus becomes more complicated because of the rapid growth of online learning in higher education and the emphasis on critical thinking. Traditional challenges in fostering critical thinking have been compounded by a generalized lack of faculty familiarity with effective online instructional techniques (Mandernach, Forrest, Babutzke, & Manker, 2009). Those described ongoing conditions technically reflect the natural conditions related to technological mastery. Then, certainly, previous students who are accustomed to having traditional methods with a teacher-centered learning experience in a physical classroom will take more time to familiarize themselves with the new distance-learning environment. All in all, educationalists are challenged to wisely position themselves as the two-dimension instructors who can balance the between promoting critical thinking theoretically, culturally, and practically in the use of online learning.

4.3. Contextualization: Critical thinking in Indonesian schools

Unsurprisingly, the implementation of critical thinking in education in Indonesia is also experiencing difficulties. It is agreed that the school or any learning environment should open the opportunity for the children to express their imagination, ideas, and innovation and should context their learning activity with social and cultural activities. Unfortunately, this application has not been applied well in Indonesia. Subkhan (2012) found that in many cases in big cities in Indonesia the early childhood learning activities were dominated by the teacher (teacher-centered). Similarly, most teaching and learning process taking place in schools in Indonesia was the lecture method, which was based on memorization of facts that leads students to think less critical (Cobb, Wood, Yackel, & McNeal, 1992; Duplass & Ziedler, 2002). The conventional method of teaching-learning methods in which a teacher becomes the center of the learning is the main reason for the low implemented critical values. The domination of teacher lectures during any learning by talking all the time have indirectly limited the time for learners to develop their critical thinking skills (Khan, 2017). This evidence further indicates that Indonesia's learning method is still dominated by conventional methods that will obstruct the students to achieve higher-order thinking process.

In addition, the promotion of students' critical thinking values is hidden in the way subjects are provided. In other words, studies have revealed that critical thinking can be implemented effectively in certain subjects, such as Mathematics. Mathematics is one of the subjects that can develop critical thinking skills (Aizikovitsh & Amit, 2010). Critical thinking skills in mathematics are the process of critical thinking related to knowledge of mathematics, mathematical reasoning, and mathematical proofs in mathematical problem solving (Krulik & Rudnick, 1995). However, ironically, a study of Trends in Mathematics and Science Study (TIMSS) (as cited in Firdaus, Kailani, Bakar, & Bakry, 2015) on secondary school students showed that the students of Indonesia ranked 38th in mathematics from 42 countries (Mullis et al., as cited in Pane, Syahputra & Mulyono, 2018). Further, the results of the PISA 2012 survey found Indonesian students at position 64 out of the 65 countries in mathematical literacy skills (Organization for Economic Cooperation and Development, as cited in Firdaus et al., 2015).

Similarly, in the English subject, language proficiency and mastery also becomes a notable factor affecting the students' critical thinking. Yet, the students faced difficulties in understanding the English written and spoken forms (Indah & Kusuma, 2016). The findings of the studies above revealed that Indonesian students mostly encountered difficulties not only in the arithmetic level but also at the lexical level, causing the students to have weak performance in non-routine problem-solving involving revelations, giving opinions, and making reasoning (Hasan, Tumbel & Corebima, 2013). Hence, all the descriptions of the learning conditions above become the reasons for the low implementation of critical thinking values in Indonesia's schools.

4.4. Possible strategies to overcome the challenges

The author here provides several strategies to overcome the challenges faced by educational practitioners in the promotion of critical thinking through online learning. The possible strategies encompass the selected method in the teaching-learning process and other theoretical and technical approaches made by instructors in online classrooms. Clark and Mayer (2008) suggest that beneath the e-learning architecture sit four key pedagogical considerations: content, instructional methods, practice examples, and feedback. In terms of content, teachers are expected can introduce critical thinking concepts in provided reading material and assignments to enhance students' understanding of critical thinking. Arend (2009) suggests that an assignment provided after having read the materials can practically affect the students' critical behavior and keep the concepts in their minds. Moreover, designing online activity is expected to be interesting in any particular digital learning platform. A case study conducted by Carmichael and Farrell (2012) in utilizing the "Blackboard" as an online learning platform found that creating a variety level of writing activity used as an approach could benefit in describing the students' critical behavior. The study also indicated that the success of using online resources for the development of the students' critical thinking in the higher education context at least partially depended on the students' developmental levels, their experience with the technology used in the academic settings, and their levels of engagement.

Most importantly, teachers as instructors hold a crucial role in designing the activity in online learning. Some work urges instructors to adopt the role of an online facilitator: This involves clarifying course topics, keeping the discussions on track, introducing opposing views to students, helping students navigate the online platform, and emphasizing good online behavior (Hew, 2015). The presence of teachers is crucial in leading the discussion to look "critical". Erikson (2019) believes that when promoting critical thinking, teacher should have the ability, disposition and motivation to distinguish the discussion that needs to be triggered by disagreement and further explanation toward students' opinions; hence students will try to formulate their thinking. Responding to that statement, therefore, even without the presence of teachers in the learning meeting, teachers are expected to provide explicit instruction, and information through dual interaction between students. A key success of a discussion in fostering students' higher-order thinking strategies is the instructor's interactivity in leading the discussion (Mandernach, 2006; Mandernach, Forrest, Babutzke, & Manker, 2009). Technically, a discussion made by teachers in an online forum or digital learning platform is considered as an effective method that can encourage students to behave critically. Therefore, Bai (2009) agrees that "well-designed discussion questions are fundamental in developing critical thinking skills at high levels" (p. 162). Nevertheless, the given work duration needs to be paid attention to by teachers. Instructors should provide enough time and structure so that students can actually think about their thinking, synthesize their knowledge from prior readings, and readily provide their

comments in either synchronized or unsynchronized group discussion threads (Kinne & Eastep, 2011).

Additionally, online interactions should work between students and a teacher and students with other students. All students should be involved in a group activity as an online community, and giving group assignment is found as an advantage. Besides, Ricci (2009) states that group assignments are an effective means of practicing and enhancing critical thinking skills. In line with Ricci, Ekahitanond (2013) mentions that peer feedback activity also stimulates students' critical thinking since each peer will prepare and anticipate their answers. Briefly, this statement is reasonable because group and peer activity will give the opportunity for the students to be open-minded, to appreciate others' opinions, and to exchange, debate, and challenge the arguments between one another. Pahl (2004) also adds that the instructor may provide a meaningful project for the students as part of active learning. The project instructed from online learning may allow the students to actively construct new skill, and to sense new experience as the process of learning in the online environment.

However, the success of the aforementioned possible strategies again depends on the teachers' capability, awareness, elaboration, and improvement in online settings. Other studies also revealed that certain strategies fostered during online course could promote learners' critical thinking ability. Learners were supposedly encouraged to be involved in questioning activity over provided health topics; there, they would argue and debate for important actions necessarily taken to handle one health issue (Lunney, Frederickson, Spark, & McDuffie, 2019). Additionally, the use of AOD (Asynchronous Online Discussion) board has been seen as a community platform by students to encourage the interaction and to gain the sense of critical thinking (Osborne, Byrne, Massey, & Johnston, 2018).

5. Conclusion

In conclusion, bringing together critical thinking in an online environment is the complete package in reflecting modern education. All the essentiality and positivity of critical thinking are becoming wanted skills in facing the globalized era. The values, concepts, and behavior of critical thinking are highly encouraged by teachers as the aim of today's higher education environment. In addition, the existence of technology such as online learning is considered an undeniable factor affecting whole facets of teaching-learning systems. Whether teachers want it or not, they have to familiarize themselves with the technology. Online learning has shown to be an excellent support to promote students' critical thinking. However, the implementation and practicality of this leave some challenges for educational practitioners. Those challenges encompass the socio-cultural matters in defining the critical concept faced by many Asian countries, especially in Indonesia's pedagogical context. Moreover, the technical and practical issues relating to the teachers' familiarity in the new online environment make the teachers difficult in designing and choosing the proper topics and methods. Finally, to

overcome those challenges, several strategies are considered to be applied by the teachers including an introduction to the proper content and exciting activities related to the essence of critical concepts, and the well-designed online discussion and group assignment.

References

Aizikovitsh, E., & Amit, M. (2010). Evaluating an infusion approach to the teaching of critical thinking skills through mathematics. *Procedia-Social and Behavioral Sciences, 2(*1), 3818-3822.

Arend, B. (2009). Encouraging critical thinking in online thread discussions. *Journal of Educators Online, 6*(1), 1-23.

Astleitner, H. (2002). Teaching critical thinking online. *Journal of Instructional Psychology, 29*(2).

Atkinson, D. (1997). A critical approach to critical thinking in TESOL. *TESOL Quarterly, 31*(1), 71-94.

Bai, H. (2009). Facilitating students' critical thinking in online discussion: An instructor's experience. *Journal of Interactive Online Learning, 8*(2), 156-164.

Carmichael, E., & Farrel, H. (2012). Evaluation of the effectiveness of online resources in developing student critical inking: review of literature and case study of a critical thinking online site. *Journal of University Teaching & Learning Practice, 9*(1).

Chang, Y. S. (2012). Student technological creativity using online problem-solving activities. *International Journal of Technology and Design Education, 23,* 803-816.

Chartrand, J., Ishikawa H., & Flanigan, S. (2009). Critical thinking means business: Learn to apply and develop the NEW #1 workplace skill. Pearson Education, Retrieved from http://www.talentlens.com/en/ downloads/whitepapers/ Pearson_TalentLens_Critical_Thinking_Means_Business.pdf

Clark, R. C., & Mayer, R. E. (2008). E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning (2nd ed.). San Francisco, CA: John Wiley & Sons, Inc.

Cobb, P., Wood, T., Yackel, E., & McNeal, B. (1992). Characteristic of classroom mathematics tradition: An interactional analysis. *American Educational Research Journal, 29,* 573-604.

Davies, M. (2015). A model of critical thinking in higher education. In M. B. Paulsen (Ed.), *Higher education: Handbook of theory and research* (pp. 41-92). https://doi.org/10.1007/978-3-319-12835-1_2

Duplass, J. A., & Ziedler, D. L. (2002). Critical thinking and logical argument. *Social Education, 66*(5), 10–14.

Ekahitanond, V. (2013). Promoting university students' critical thinking skills through peer feedback activity in an online discussion forum. *Alberta Journal of Educational Research, 59*(2), 247-265.

Erikson, M. G. (2019, February). *Supporting critical thinking in higher education: Consideration for strategic discussions*. Paper presented at the 2019 European Learning & Teaching Forum of European University Association, University of Warsaw, Warsaw. Retrieved from: https://eua.eu/resources/publications/847:supporting-critical-thinking-in-higher-education-%E2%80%93-considerations-for-strategic-discussions.html

Facione, P. A. (1990). *The Delphi report: Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction*. Millbrae, CA: California Academic Press.

Firdaus, Kailani, I., Bakar, M. N. B., & Bakry. (2015). Developing critical thinking skills of students in mathematics learning. *Journal of Education and Learning, 9*(3), 226-236.

Foo, S. Y. & Quek, C. L. (2019). Developing students' critical thinking through asynchronous online discussion: A literature review. *Malaysian Online Journal of Educational Technology, 7*(2), 37-58.

Goodsett, M. (2020). Best practices for teaching and assessing critical thinking in information online learning objects. *The Journal of Academic Librarianship, 46*(5). doi: doi.org/10.1016/j.acalib.2020.102163

Habiburrahim, H. (2015). The internet and ICT: Opportunities or threats to the education world? *Englisia: Journal of Language, Education, and Humanities, 3*(1), 1-8.

Hadjerrouit, S. (2007). Using an understanding of the learning cycle to build effective e-Learning. In N. A. Buzzetto-More (Ed.), *Advanced principles of effective e-Learning* (pp. 27-58). Santa Rosa, CA: Informing Science Press.

Harvey, A., & Kamvounias, P. (2008). Bridging the implementation gap: a teacher-as-learner approach to teaching and learning policy. *Higher Education Research and Development, 27*(1), 31–41. doi:10.1080/07294360701658716.

Hasan, S., Tumbel, F. M., & Corebima, A. D. (2013). Empowering critical thinking skills in Indonesia archipelago: Study on elementary school students in Ternate. *Journal of Modern Education Review, 3*(11), 852-858.

Hew, K. F. (2015). Promoting engagement in online courses: What strategies can we learn from three highly rated MOOCS. *British Journal of Educational Technology,* 1-17. doi: http://dx.doi.org/10.1111/bjet.12235.

Indah, R. N., & Kusuma, A. W. (2016). Factors affecting the development of critical thinking of Indonesian learners of English language. *IOSR Journal of Humanities and Social Science, 21*(6), 86-94.

Jang, S. J. (2009). Exploration of secondary students' creativity by integrating web-based technology into an innovative science curriculum. *Computers and Education, 52*, 247–255.

Khan, S. I. (2017). Critical thinking in a higher education functional English course. *European Educational Research Journal, 6*(1), 59-57. doi: 10.12973/eu-jer.6.1.59.

Kinne, L. J., & Eastep, S. M. (2011). Instructional design in online learning: Component of quality. *Kentucky Journal of Excellence in College Teaching and Learning, (6)*1. Retrieved from: https://encompass.eku.edu/kjectl/vol6/iss1/4

Krulik, S., & Rudnick, J. A. (1995). *The new sourcebook for teaching reasoning and problem solving in elementary school. A Longwood professional book.* Boston, MA: Temple University.

Kuhn, D. (1999). A developmental model of critical thinking. *Educational Researcher, 28*(2), 16-26.

Lloyd, M., & Bahr, N. (2010). Thinking critically about critical thinking in higher education. *International Journal for the Scholarship of Teaching and Learning, 4*(2), 1-16. doi: doi.org/10.20429/ijsotl.2010.040209

Lopez-Perez, M. V., Perez-Lopez, M. C., & Rodriguez-Ariza, L. (2011). Blended learning in higher education: students' perceptions and their relation to outcomes. *Computers & Education, 56*(3), 818–826. doi:10.1016/j.compedu.2010.10.023

Lunney, M., Frederickson, K., Spark, A., & McDuffie, G. (2019). Facilitating critical thinking through online courses. *Journal of Asynchronous Learning Network, 12*(3-4), 85-97. doi: 10.24059/olj.v12i3-4.1686

MacKnight, C. B. (2000). Teaching critical thinking through online discussions. *Educause Quarterly, 4,* 38–41.

Mandernach, B. J. (2006). Thinking critically about critical thinking: Integrating online tools to promote critical thinking. *InSight: A Collection of Faculty Scholarship, 1*, 41-50.

Mandernach, B. J., Forrest, K. D., Babutzke, J. L., & Manker, L. R. (2009). The role of instructor interactivity in promoting critical thinking in online and face-to-face classrooms. *Merlot Journal of Online Learning and Teaching*, *5*(1), 49-62.

McMillan, J. H. (1987). Enhancing students' critical thinking: A review of studies. *Research in Higher Education, 26*(1), 3-29.

Meyers, C. (1986). *Teaching students to think critically: A guide for faculty in all disciplines.* San Francisco, CA: Jossey-Bass.

Ministerial Council for Education, Early Childhood Development, and Youth Affairs. (2008). Melbourne declaration on educational goals for young Australians. Canberra, Australia: Commonwealth of Australia.

Moon, J. (2007). *Critical thinking: An exploration of theory and practice.* New York, NY: Routledge.

Osborne, D. M., Byrne, J. H., Massey, D.L., & Johnston, A. N. B. (2018). Use of online asynchronous discussion boards to engage students, enhance critical thinking, and foster staff-student/student-student collaboration: A mixed method study. *Nurse Education Today, 70,* 40-46. doi: doi.org/10.1016/j.nedt.2018.08.014

Pahl, C. (2004). Data mining technology for the evaluation of learning content interaction. *International Journal on E-Learning, 3*(4), 48- 59.

Pane, N., Syahputra, E., & Mulyono. (2018). Improving the ability of creative thinking mathematically and self-confidence student through Application Model Eliciting Activities (MEAs) Review from Student Gender. *American Journal of Educational Research, 6*(4), 319-323. doi: 10.12691/education-6-4-4.

Paré, G., Trudel, M.C., Jaana, M., & Kitsiou, S. (2015). Synthesizing information systems knowledge: A typology of literature reviews. *Information & Management, 52*(2), 183–199.

Paul, R., & Elder, L. (2008). Critical thinking: Strategies for improving student learning, Part II. *Journal of Developmental Education, 32*(2), 34-35.

Peck, J. J. (2012). Keeping it social: Engaging students online and in class. *Asian Social Science, 8*(14), 81-90. doi: :10.5539/ass.v8n14p81.

Phirangee, K., Demmans, E. C., & Hewitt, J. (2016). Exploring the relationships between facilitation methods, students' sense of community and their online behaviors. *Online Learning, 20*(2), 134-154.

Pyle, R. (1997). *Teaching Critical Thinking Online.* Retrieved from http://reach.ucf.edu/~aln/pyle/ main.html.

Ricci, A. F. (2009). Encouraging critical thinking in distance learning ensuring challenging intellectual programs. *United States Distance Learning Association. 10*(1), 1-15.

Samanhudi, U., & Sampurna, P. (2010). Researching students' critical thinking in EFL writing class (a case study in English education department, Untirta). *TEFLIN 57th Revitalizing Professionalism in ELT as a Response to Globalized World.* Bandung, Indonesia: Indonesia University of Education.

Scriven, M., & Paul, R. (2003). *Defining critical thinking: A draft statement prepared for the National Council for Excellence in Critical Thinking Instruction.* Retrieved from: http://www.criticalthinking.org/University/defining.html.

Stapleton, P. (2001). Assessing critical thinking in the writing of Japanese university students: Insight about assumption and content familiarity. *Written Communication, 18*(4), 506-546. doi: 10.1177/0741088301018004004.

Stice, J. E. (1987). Developing critical thinking and problem-solving abilities. *New Directions for Teaching and Learning, 30,* 73-92.

Subkhan, E. (2012, September). *Paradigm shifts on educational technology and its possibilities for transformative action.* Paper presented in First International Conference on Current Issues in Education (ICCIE) held by Yogyakarta State University and National University of Malaysia, Yogyakarta.

Zainuddin, Z. (2015). Exploring the potential of blended learning and learning management system for higher education in Aceh. *Englisia: Journal of Language, Education, and Humanities*, *2*(2), 70-85.

Zhang, L. F., & Sternberg, R. J. (2006). *The nature of intellectual styles.* Mahwah, NJ: Lawrence Erlbaum.